



The MSTA School Traffic Calculator

Provided by: Municipal and School Transportation Assistance

Traffic Engineering and Safety Systems Branch
Division of Highways
North Carolina Department of Transportation



It is the responsibility of the local school officials to contain all school generated traffic on campus and to maintain a safe and efficient student loading operation. The intent of this calculator is to provide a conservative estimate of the traffic generated, on an average school day, based on the maximum buildout of the school student population. Calculations reflect the minimum number of vehicles expected and does not take into consideration high traffic demand days and/or special events. To provide maximum safety for pedestrians and motorists during peak demands, the school is expected to have an alternative traffic flow plan that will prevent school related vehicles from presenting a hazard along nearby public streets.

Calculations are based on averaging traffic volume and vehicle queue data obtained at public and private schools across North Carolina

INSTRUCTIONS

1. Insert the school name. (You can use the TAB key to move to the next input space)
2. Identify if your school is Public or Private. (If private, change "Yes" to "No")
3. Select your "Type School" and insert the following data with **MAXIMUM** buildout numbers:
 - Student Population
 - (If the following numbers are unknown, estimates are provided below the input cell)
 - Number of Buses
 - Number of Faculty Members including teacher assistants and other part time personnel
 - Maximum number of High School Student Drivers
4. In the Type School information area, open cells are provided to input buses going to other locations.
5. You have completed the required input data. A brief decryption of the output is provided below:

Calculations	PM Total Number of Vehicles	A conservative number of total PM vehicles expected to pick up students on an average day.
	PM Peak Vehicles	The peak number of vehicles that will be on campus at one time during the PM student pick-up.
	Minimum Queue Length	The minimum driveway length required to contain the "PM Peak Vehicles."
	Total AM Trips	The average number of vehicle trips expected during the peak AM school traffic period.
	Total PM Trips	The average number of vehicle trips expected during the peak PM school traffic period.

NOTE: Additional driveway length or other accommodations should be provided for high traffic demand days (assemblies, inclement weather, and/or special events).

MSTA School Traffic Calculations

AM and PM Peak Traffic Estimates
(These numbers do not reflect peak hour traffic volumes)

School Name: _____
Version: 42808

MSTA School Queue Input		Calculations							
Type School	Student Population	Number of Buses	Staff Members	Student Drivers	PM Total Vehicles	PM Peak Vehicles	Minimum Queue Length	Total AM Trips	Total PM Trips
Elementary	585	7	88		96	44	969	530	206
Middle		8	69						
High									
							969	530	206

Private School data is based on no buses and uses the same percentages for all school types (elementary, middle, & high).

AM Cars/Student	PM Cars/Student	Avg. Car Length	PM At one Time
36.56%	16.31%	22.19	45.50%
34.58%	14.10%	22.70	51.90%
9.20%	4.30%	24.42	55.71%
P 43.35%	26.30%	22.00	37.87%

Elementary School Data					
Direction	Parents	Buses	Staff	Trips	PM Trips Generated
IN	214	7	88	309	96
OUT	214	7	221	96	7
AM Elementary Trips					530
PM Elementary Trips					206

Middle School Data					
Direction	Parents	Buses	Staff	Trips	PM Trips Generated
IN					
OUT					
AM Middle Trips					
PM Middle Trips					

High School Data					
Direction	Parents	Buses	Staff	Trips	PM Trips Generated
IN					
OUT					
AM High Trips					
PM High Trips					
Total All AM Trips					In: 309, Out: 221, Total: 530
Total All PM Trips					In: 103, Out: 103, Total: 206

NOTES

- Minimum Queue Length does NOT include an alternative traffic pattern for high traffic demand days.
- Peak traffic volumes at schools normally occur within a 30-minute time period. (PHF of 0.5)

DEPARTMENT OF TRANSPORTATION TO EVALUATE THE LOCATIONS
OF PROPOSED PUBLIC AND PRIVATE SCHOOLS TO ENHANCE TRAFFIC
OPERATIONS AND SAFETY

SECTION 27.27. G.S.136-18 reads as rewritten:

“§ 136-18. Powers of Department of Transportation.

The said Department of Transportation shall be vested with the following powers:

- (29a) To coordinate with all public and private entities planning schools to provide written recommendations and evaluations of driveway access and traffic operational and safety impacts on the State Highway system resulting from the development of the proposed sites. All public and private entities shall, upon acquiring land for a new school or prior to beginning construction of a new school, relocating a school, or expanding an existing school, request from the Department a written evaluation and written recommendations to ensure that all proposed access points comply with the criteria in the current North Carolina Department of Transportation ‘Policy on Street and Driveway Access’. The Department shall provide the written evaluation and recommendations within a reasonable time, which shall not exceed 60 days. This subdivision shall not be construed to require the public or private entities planning schools to meet the recommendations made by the Department, except those highway improvements that are required for safe ingress and egress to the State highway system.”

For further information go to the NC statute lookup at:

<http://www.ncga.state.nc.us/gascripts/statutes/statutelookup.pl?ChapNum=136>

SCHOOL SITE PLAN REVIEW CHECKLIST

WHAT MSTA LOOKS FOR?

General Information

-] Maximum student population for proposed school, number of faculty/staff, number of buses
-] School Type: Public, Private (indicate "No" in Calculator if Charter, Magnet, or Year Round)
-] Grade Level: Elementary (including Pre-K and K), Middle, High
-] Program Type: Traditional, Year Round
-] School hours of operation (make considerations for any pre-school and after-school programs)
-] Are there any plans to increase the student population (future construction or install mobile units)?

Loading Operations

-] Input student population into the MSTA Calculator to determine peak AM and PM traffic volumes and vehicle queues.
-] Does the site plan provide adequate queue length? Compare the Required Queue Length from the *Calculator* to the site plan. Sites may not show the parent traffic pattern to reach the loading zone, use engineering judgement to decide the most appropriate route.
-] Is the student loading zone for parent pickup/drop-off defined? If so, is it located near the main building entrance? Are sidewalks and covered walkways provided? Are 5 to 7 loading bays identified with proper dimensions (8-ft wide with lengths of 20-ft end and others 28-ft to 30-ft)? Is a lane available for vehicles to pass when necessary?

Traffic Operations

-] Determine the traffic volumes along roads adjacent to school property?
-] If there is joint use of property, between two or more schools, will they operate at the same time or be offset? (typical offset is a minimum of 30 min)
-] Determine the origin and destination (percent breakout) for the parent traffic.
-] Are there different traffic patterns for staff, parents, bus and student drivers?
-] Check for any internal traffic conflicts and pedestrian safety concerns.
-] Is the student and bus loading operations identified in separate areas?
-] Check for sight distance. Are the driveways located in a curve (horizontal or vertical)?
(minimum rule of thumb: sight distance (feet) = 10 x Posted Speed Limit, i.e. 10 x 35 mph = 350 feet)
-] How many driveways are proposed? Are they full access, right-in/right-out, one-way, etc.?
-] Do the driveways have appropriate spacing? For full movement the *Driveway Manual* (pg. 42) recommends at least 600 feet; however, engineering judgement may be necessary.
-] Are the driveway stems adequate? *Driveway Manual* (pg. 33).
-] Are appropriate driveway turning radii provided (including internal) *Driveway Manual* (pg. 34,51)?
-] Are turn lanes into the school provided? If so, are storage lengths and tapers in accordance to the *Driveway Manual*

Parking

-] Is there enough parking for faculty, staff, and buses?
-] Are parking stall widths minimum 9-ft wide with isle widths: 90 deg. two-way = 24-ft, 45 deg. one-way = 10-ft-3-in?
-] Is "Visitor Parking" provided and identified with appropriate pavement markings and/or signs?
(MSTA recommends between 5 to 15 spaces to be placed beyond the student loading zone).
-] Do cars, buses, and WB-40 vehicles have proper turning radii at appropriate locations?
-] At a High School, how many student spaces are provided?

Pedestrians and Bicycles

-] Are sidewalks provided on campus and adjacent to school property? Appropriate widths (5-ft min.) and locations?
-] Can faculty, visitors, and students walk from parking lot to building safely?
-] Does the school have a "School Walk Route Plan" and Established School Crossings (MUTCD 7A-3)?
-] Are crosswalks provided on campus and adjacent to school property? Appropriate markings and locations?
-] Are appropriate bicycle stands available?

Calculator – MSTA School Traffic Calculator (www.ncdot.org/~msta)

Driveway Manual - 2003 NCDOT publication [Policy on Street and Driveway Access to North Carolina Highways](#)